totemism: "I was unable to discover the faintest trace of any idea which might be regarded as being totemistic, or having a totemistic origin." This fact, interesting in itself, is rendered the more interesting by the parallel observation that "art and design among the Mafulu people are only of a simple and primitive type." As one passes from coast and plains to the hills, there is "a sudden drop from artistic designs embodying curves and natural imitative art to a system confined to straight lines, zigzags, and spots:" this in spite of a "contact which has certainly existed for some time back." The author concludes, reasonably enough, that the lack of imitative art "is partly due to the absence of totemism and of the imitative stimulus which, as Dr. Haddon has more than once pointed out, arises from it."

The volume is well illustrated by 91 photographic plates and 10 figures in the text; there is also a good map. There are five linguistic appendices by Messrs. Ray and Strong, largely based on the work of the Rev. Father Egedi and the Rev. E. P. Money. E. B. T.

The Gateways of Knowledge: an Introduction to the Study of the senses. By J. A. DELL. Cambridge, The University Press; New York, G. P. Putnam's Sons. 1912. pp. xii, 171. Price $1.50.

This little book contains a number of elementary exercises in experimental psychology, with parallel reference to anatomy and physiology. After an introduction dealing with the Meaning of Observation, the following topics are discussed: the Brain, Nerves and Organs of Sense; the Cutaneous Senses; the Machinery and Experience of Movement; Taste and Smell; Sound and Hearing; Light, the Eye, and Sight; Action; and Memory. The work is intended for pupils of about 12 to 15 years of age, and the experiments and materials are much simpler than those, *e. g.*, of Seashore's *Elementary Experiments in Psychology.* The author is plainly an enthusiast for his subject; he writes with clearness, and yet without shirking difficulties of subject-matter and of method; and some of his devices, as well as some of the additional exercises appended to the various chapters, are most ingenious. It should be said, however, that there are additional exercises which call for more knowledge than is imparted in the text.

The book is, I believe, the first of its kind; it marks a new departure in Great Britain; and it will, no doubt, pass through a number of editions. For these reasons I think it worth while to offer suggestions and criticisms in some little detail.

The author rightly distinguishes the questions "How does the sense-organ work?" and "What does it feel like to see (hear, taste, etc.)?" Yet his psychological exercises rarely take the form 'what does it feel like;' for the most part they give answers to the questions "How delicately or accurately can we feel?" and "What information regarding the outside world do we get by seeing, etc.?" Here is a confusion (witnessed by the 'sensations of heaviness, whiteness' and the like on page 2, and by the 'two sensations' received from a pair of gloves on page 22) which, one would suppose, an intelligent pupil must remark, and which also detracts from the scientific value of the work; a standpoint, once chosen, should be adhered to. Passing to special points, I suggest that needles might be replaced by bristles in the aesthesiometric experiment. Short hog's bristles, with points rounded by burning, serve the purpose; the same bristles may be used for the detection of pressure spots,—which the author does not mention, though he refers to cold and warmth (erroneously called heat) spots. The silk threads of the touch-weights should be fixed by sealing-wax to

the ends of matches; the use of the bare silk is inconvenient. I doubt whether warmth spots can be found by the method given (p. 34). The sensation of pain should not be confused with unpleasant feeling. On page 39 text and figure are not in agreement; the figure on page 45 has no letter D; the figure on page 96 needs further explanation, since the retina appears to be continued into the zonule of Zinn. On pages 58-9 there is a confusion of letter and packet. On page 60 Weber's Law appears without explanation as the Weber-Fechner Law (see pp. 29 f.). On page 63 there is confusion of adaptation with fatigue; and the night-blindness of the fovea is ignored. It is not correct to say that the internal ear "consists of cavities in the ear bone." The English of Hörmesser is acoumeter. On page 83, 1906 should be 1905. The neglect of contrast and adaptation on pages 108 f. is remarkable. The phrase "unconscious use of the imagination" (p. 126) is not scientific. On page 131 'several times' should be 'twice.' The reference to Sanford on page 135 will mislead the pupil; the method goes back to Helmholtz and Aubert. The norm of 0.27 sec. on page 150 is seriously misleading. The graph on page 153 omits three determinations, and the 40 per cent. is evidently a mistake.

These are small matters, which the author, if he will, can readily change. I suggest, further, that a qualitative aesthesiometric experiment be introduced, in which the observer is not confined to the judgments 1 and 2; and that experiments on visual contrast and adaptation be added. There is much cheap apparatus of which the author is apparently unaware. Thus Nagel's cards serve excellently for the diagnosis of color-blindness; it is unnecessary to pay $30 for the Edridge Green lantern. The spectrum-chart saves the expense of a spectroscope. I assume that the whirling-table is to be borrowed from the Physical Laboratory; but borrowing and lending are ticklish things; and Mr. Dell will find that a mechanical mixer of the Hering type can be built very cheaply from odd wheels to be picked up at any machine-shop. The mixer will then serve for a number of experiments, and will replace the whirling string of ex. 72. Nendel has some cheap materials for visual sensation; my own adaptation frame (*Text-book*, p. 73) may be made at home for next to nothing; and an admirable demonstration of contrast may be given with black, white and grey papers, mounted on a folding card like a Japanese screen. I understand that Münsterberg's Pseudoptics is, unfortunately, off the market; many interesting optical illusions may, however, be shown by means of black and white cards and paper-fasteners. Galton's weights may be copied by weighted pay-envelopes or cartridge-cases. E. B. T.

Modern Science and the Illusions of Professor Bergson. By H. S. R. ELLIOT. With a preface by Sir Ray Lankester. New York and London, Longmans Green & Co., 1912. pp. xix, 257. Price $1.60 net.

This little book contains a spirited, not to say a violent attack upon the philosophical teaching of M. Bergson. An Introduction points out the futility and incomprehensibility of all metaphysics, and represents Bergson as attempting a mediation between mechanism and teleology. Ch. II sets forth the leading doctrines of the *Creative Evolution* and the *Matter and Memory*. Ch. III gives the author's reasons for dissent. Bergson is guilty of three fallacies: he thinks that disproof of rival theories is proof of his own; he is addicted to false analogies; he makes deductions from questionable premises. He is chargeable, further, with hopeless and irremediable misuse of language. In par-